

B1
Amended

15. (Twice Amended) Method as according to claim 12, characterized in that a charge or discharge switch (3, 5) of the system is switched from the OFF position to the ON position to allow charging or discharging at a predefined time of the time characteristic after the absolute value of the current is equal to or less than the event characteristic which is a predefined lower limit threshold current.

16. (Twice Amended) Method as according to claim 12, characterized in that a square-wave signal of a certain frequency is used to switch a charge or discharge switch (3, 5) from an OFF position to an ON position to allow charging or discharging and characterized in that the charge or discharge switch (3, 5) is switched from the ON position to the OFF position when the absolute value of the current is equal to or greater than the event characteristic which is a predefined upper limit threshold current.

Please add the following new claims:

B2

--19. (New) An apparatus for charging and discharging a piezoelectric element, comprising:

an arrangement configured to regulate a current as a function of a time characteristic and an event characteristic to achieve an effective low average current.

20. (New) The apparatus according to claim 19, further comprising a charge switch and a discharge switch, the arrangement configured to switch the charge switch and the discharge switch as a function of the time characteristic and the event characteristic to achieve the effective low average current.

21. (New) The apparatus according to claim 20, wherein the arrangement is configured to maintain the charge switch open for a predefined time interval to allow the current to exhibit a gap when the current is at a level below a predefined lower threshold.

22. (New) The apparatus according to claim 20, wherein the event characteristic includes a predefined limit threshold current, the arrangement configured to switch the charge switch from an ON position to an OFF position to

allow charging when an absolute value of the current is equal to or greater than the predefined limit threshold current and to switch the discharge switch from an ON position to an OFF position when the absolute value of the current is equal to or less than the predefined limit threshold current.

B2
cmt.

23. (New) The apparatus according to claim 20, wherein the event characteristic includes a predefined lower limit threshold current, the arrangement configured to switch one of the charge switch and the discharge switch from an OFF position to an ON position and from an ON position to an OFF position to respectively allow and stop charging and discharging at a predefined time of the time characteristic after an absolute value of the current is equal to or less than the predefined lower limit threshold current.

24. (New) The apparatus according to claim 20, wherein the arrangement is configured to switch one of the charge switch and the discharge switch from an OFF position to an ON position to respectively allow charging and discharging in accordance with a square-wave signal having a predetermined frequency.

25. (New) The apparatus according to claim 20, wherein the event characteristic includes a predefined limit threshold current, the arrangement configured to switch one of the charge switch and the discharge switch from an ON position to an OFF position when an absolute value of the current is equal to or greater than the predefined limit threshold current.

26. (New) The apparatus according to claim 19, wherein the arrangement is configured to vary the time characteristic and the event characteristic to achieve a desired average current.

27. (New) The apparatus according to claim 20, wherein the arrangement is configured to predefine a time delay and to switch the charge switch and the discharge switch to an ON position in accordance with the time delay, the arrangement configured to predefine the time delay to trigger when an absolute value of the current is equal to or greater than a predefined current threshold.

*By
cont.*

28. (New) The apparatus according to claim 19, wherein the current is not regulated within a current band and exhibits gaps.

B2
Cmt.

29. (New) An apparatus for charging and discharging a piezoelectric element of a fuel injection system, comprising:

an arrangement configured to regulate a current of the fuel injection system as a function of a time characteristic and an event characteristic to achieve an effective low average current.

30. (New) The apparatus according to claim 29, wherein the fuel injection system includes a double acting control valve.

31. (New) A method for charging a piezoelectric element in a system, comprising the step of:

regulating a current of the system as a function of a time characteristic and an event characteristic to achieve an effective low average current.

32. (New) The method according to claim 31, wherein the event characteristic includes a predefined limit threshold current, the regulating step including the substep of selectively switching one of a charge switch and a discharge switch one of from an ON position to an OFF position and from an OFF position to an ON position to one of allow and stop a respective one of charging and discharging when an absolute value of the current is respectively equal to or greater than or less than the predefined limit threshold current.

33. (New) The method according to claim 32, wherein the event characteristic includes a predefined lower limit threshold current, the regulating step including the substep of switching one of the charge switch and the discharge switch from the OFF position to the ON position to respectively allow charging and discharging at a predefined time of the time characteristic after the absolute value of the current is equal to or less than the predefined lower limit threshold current.

B2
cancel
34. (New) The method according to claim 32, wherein the event characteristic includes a predefined upper limit threshold current, the regulating step including the substeps of:

switching one of the charge switch and the discharge switch from the OFF position to the ON position to respectively allow charging and discharging in accordance with a square-wave signal having a predetermined frequency; and

switching one of the charge switch and the discharge switch from the ON position to the OFF position when the absolute value of the current is equal to or greater than the predefined upper limit threshold current.

35. (New) A method for charging and discharging a piezoelectric element of a fuel injection system, comprising the step of:

regulating a current of the fuel injection system as a function of a time characteristic and an event characteristic to achieve an effective low absolute average current.

36. (New) The method according to claim 35, wherein the fuel injection system includes a double acting control valve.

37. (New) A method for charging and discharging a piezoelectric element of a fuel injection system, comprising the steps of:

defining an absolute value of a current for one of charging and discharging the piezoelectric element as a function of a time characteristic of the fuel injection system; and

one of charging and discharging the piezoelectric element after the defining step.

38. (New) The method according to claim 37, wherein the fuel injection system includes a double acting control valve.--.

REMARKS

I. Introduction

With the addition of new claims 19 to 38 and the cancellation of claim 18 without prejudice, claims 1 to 17 and 19 to 38 are pending in the present